

Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1. (previously presented) An optical fiber comprising:
a core; and
a thixotropic cladding layer including a plurality of hydrophilic nano-particles proximate the surface of the core, and a plurality of hydrophobic nano-particles around a layer of the hydrophilic nano-particles.
2. (Original) The optical fiber of claim 1, wherein the cladding layer includes a filler.
3. (Original) The optical fiber of claim 2, wherein the filler includes at least one of a polymer, synthetic oil, poly-siloxane and Teflon.
4. (Original) The optical fiber of claim 1, further including an overclad layer around the cladding layer.
5. (Previously presented) The optical fiber of claim 4, wherein the overclad layer includes Teflon.
6. (Original) The optical fiber of claim 1, wherein the core is a silica glass core.
7. (previously presented) The optical fiber of claim 1, wherein the cladding layer includes nano-particles of at least one of silica, molybdenum disulfide, and a metallic oxide.
8. (Previously presented) The optical fiber of claim 7, wherein the metallic oxide is one of titanium oxide, aluminum oxide and magnesium oxide.

9. (Cancelled)

10. (Cancelled)

11. (Original) The optical fiber of claim 1, wherein the cladding layer includes a plurality of layers of nano-particles, the plurality of layers having different hydrophobicity characteristics.

12. (previously presented) The optical fiber of claim 1, wherein the hydrophilic nano-particles include metallic oxide nano-particles and the hydrophobic nano-particles include silica nano-particles.

13. (previously presented) The optical fiber of claim 1, wherein the hydrophilic nano-particles include molybdenum disulfide nano-particles and the hydrophobic nano-particles include Teflon.

14. (Original) The optical fiber of claim 1, wherein the cladding layer includes a resin foam.

15. (canceled)

16-30. (canceled)

31. (Cancelled)

32. (Cancelled)

33. (currently amended) A method of manufacturing a fiber structure comprising the steps of:

forming a fiber core; and

coating the fiber core with a thixotropic cladding layer that includes hydrophilic nano-particles,

wherein the inner layer includes metallic oxide nano-particles, and the outer layer includes silica nano-particles.

34. (Original) The method of claim 33, further including the step of forming an overclad layer over the cladding layer.

35. (Original) The method of claim 33, wherein the coating step forms an inner layer of nano-particles, and an outer layer of nano-particles, the inner and outer layers having dissimilar hydrophobicity.

36. (currently amended) ~~The method of claim 35,~~ A method of manufacturing a fiber structure comprising the steps of:

forming a fiber core; and

coating the fiber core with a thixotropic cladding layer that includes hydrophilic nano-particles,

wherein the coating step includes the step of negatively charging the fiber core, positively charging the inner layer, and negatively charging the outer layer.

37. (canceled)

38. (Original) The method of claim 33, wherein the coating step includes the step of immersing the fiber structure in a water-alcohol medium that includes the nano-particles.

39. (Original) The method of claim 33, wherein the coating step includes the step of drying the fiber structure azeotropically.

40. (Original) The method of claim 33, wherein the coating step includes the step of drawing the fiber core through a paste that includes the nano-particles.

41. (previously presented) The method of claim 33, wherein the coating step includes the steps of:

applying a polymer with the nano-particles to the fiber core; and
curing the polymer.

42. (Original) The method of claim 33, wherein the coating step forms the cladding layer that includes a filler in which the nano-particles are embedded.

43. (canceled)

44. (previously presented) An optical fiber comprising:

a core; and

a thixotropic cladding layer including a plurality of nano-particles around the core, wherein the cladding layer includes an inner layer comprised of hydrophilic metallic oxide nano-particles and outer layer comprised of hydrophobic silica nano-particles.

45. (previously presented) An optical fiber comprising:

a core; and

a thixotropic cladding layer including a plurality of hydrophobic and hydrophilic nano-particles around the core, wherein the cladding layer includes an inner layer comprised of molybdenum disulfide nano-particles and an outer layer comprised of Teflon.

46. (Previously presented) A method of manufacturing a fiber structure comprising the steps of:

forming a fiber core; and

coating a fiber core with a cladding layer that contains nano-particles, comprising the steps of:

forming an inner layer and an outer layer of nano-particles having dissimilar hydrophobicity; and

negatively charging the fiber core, positively charging the inner layer, and negatively charging the outer layer.

47. (previously presented) A method of manufacturing a fiber structure comprising the steps of:

forming a fiber core; and

coating a fiber core with a thixotropic cladding layer that includes nano-particles; wherein the coating step forms an inner layer and an outer layer of hydrophilic and hydrophobic nano-particles, respectively.

48. (currently amended) An optical fiber comprising:

a core; and

a thixotropic cladding layer around the core and having hydrophobic and hydrophilic nano-particles,

wherein the cladding layer has an inner region adjacent to the core and an outer region around the inner region; and the inner region comprises the hydrophilic nano-particles and the outer region comprises the hydrophobic nano-particles.

49. (Previously presented) The optical fiber of claim 48, wherein the cladding layer further comprises a filler.

50. (canceled)

51. (Previously presented) The optical fiber of claim 49, wherein the filler is hydrophobic.

52. (Previously presented) The optical fiber of claim 48, wherein the cladding layer has an inner region adjacent to the core and an outer region around the inner region; and the inner region comprises the hydrophilic nano-particles and the outer region comprises the hydrophobic nano-particles.

53. (Previously presented) The optical fiber of claim 1, wherein the hydrophobic nano-particles are selected from the group consisting of silica and Teflon.

54. (Previously presented) The optical fiber of claim 1, wherein the hydrophilic nano-particles are in direct contact with the core.

55. (canceled)

56. (canceled)

57. (Previously presented) An optical fiber comprising:
a core;
a thixotropic cladding layer around the core, the cladding layer comprising a plurality of hydrophilic nano-particles forming an inner region of the cladding layer proximate the surface of the core; and
a plurality of hydrophobic nano-particles forming an outer region of the cladding layer.

58. (Previously presented) The optical fiber of claim 1, wherein the nano-particles have diameters in the range of approximately 5 to 150 nm.

59. (Previously presented) The optical fiber of claim 2, wherein the filler comprises air.

60. (Previously presented) The optical fiber of claim 1, wherein an effective refractive index of the cladding layer is approximately unity.

61. (Previously presented) The optical fiber of claim 1, wherein an overall diameter of the optical fiber is between approximately 12 and 15 microns.

62. (previously presented) The optical fiber of claim 1, wherein the nano-particles are movable within the cladding.

63-65. (canceled)

66. (previously presented) The method of claim 47, wherein the inner layer comprises metallic oxide nano-particles and the outer layer comprises silica nano-particles.